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Elective Induction of Labour. A Benefit to the Mother and Foetus/Neonate or an Obstetric Hazard?

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Abstract: In the period from January 1, 1992 to December 31, 1996, 578 term pregnancies were terminated by programmed labour at the 2nd Clinic of Gynaecology and Obstetrics in Brno. Labour was induced by extraamniotic application of PGE2 (Prostin Upjohn 3.0 mg vaginal tablets). According to the cervix ripeness, a maximum of 2 doses were given in a two-hour interval, namely 0.5 mg PGE2 in the Bishop score was 8 and 1.0 mg PGE2 if the Bishop score was 5 to 8 points. The results were compared with a random group of 1112 non-risk mothers who where delivered in the period from January 1, to December 31, 1996. The first stage of labour was longer in patients with spontaneous labour. The second stage of labour was longer in the induced patients. The third stage of labour was shorter in induced multiparous patients. In primiparas with elective induction of labour the rate of postpartum pathologies was lower than in spontaneously delivered patients. It follows from the results that the programmed delivery does not increase the perinatal risk for the mother and the foetus. On the contrary, it is a benefit to the mother, to her family and to the staff of the delivery ward.

Zusammenfassung: *Elektive Geburtseinleitung – Nutzen für Mutter und Neugeborenes oder geburtshilfliches Wagnis?* In der Zeit vom 1. Januar 1992 bis zum 31. Dezember 1996 wurden 587 ausgetragene Schwangerschaften durch eine programmierte Geburt an der zweiten Klinik für Gynäkologie und Geburtshilfe in Brünn beendet. Die Wehen wurden durch die extraamniotische Applikation PGE2 (Prostin Upjohn 3,0 mg Vaginaltabletten). Entsprechend der Reife des Muttermundes wurden höchstens zwei Dosierungen in einem Zwei-Stunden-Abstand gegeben, und zwar 0,5 mg PGE2, wenn die Meßeinheit nach Bishop 8 war, und 1,0 mg PGE2, wenn die Meßeinheit nach Bishop zwischen 5 und 8 Punkten lag. Die Ergebnisse wurden mit einer randomisierten Gruppe von 1112 Müttern, bei denen keine Risiken vorlagen, verglichen, die in der Zeit zwischen dem 1. Januar und dem 31. Dezember 1996 entbunden haben. Die erste Phase der Wehen war bei den Pa-

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tienten mit spontanen Wehen länger. Die zweite Phase der Wehen war länger bei den eingeleiteten Geburten. Die dritte Phase der Wehen war bei den eingeleiteten Geburten bei Mehrgebärenden kürzer. Bei der Erstgebärenden mit elektiver Weheneinleitung war der Prozentsatz an nachgeburtlichen Krankheitserscheinungen niedriger als bei den Spontangeburten. Aus diesen Ergebnissen folgt, daß die progammierte Entbindung die perinatalen Risiken für Mutter und Kind nicht erhöht. Im Gegenteil, hat sie für die Mutter, die Familie und das Team der Entbindungsstation Vorteile.

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At present in the induction of labour by means of different preparations, the use of prostaglandins has become a current therapeutic procedure in many delivery wards. The rate of labour induction is different not only in individual countries, where Great Britain plays a dominant role with 20 to 50%, but also within framework of a single country between various clinics and departments of obstetrics and gynaecology. Even in a single obstetric unit there may be different attitudes of the clinicians to the individual labour induction schemes, a fact that manifests itself by a different rate of indications for the labour induction. The induction of labour is a generally accepted obstetrical procedure provided that it is performed on the basis of a medical indication, i.e. in the cases in which induction of labour terminates a high-risk pregnancy and thus improves the perinatal results. The opinions of both the medical and lay communities on the elective induction of labour are controversial (Macer, Macer, and Chan 1992).

Nevertheless, many departments have gathered very positive experience with the elective induction of labour without any negative impact on the perinatal outcome and there are also many mothers wishing to programme the time of their delivery. The ever increasing presence at the delivery of fathers who want to know the exact time of labour in view of their professional obligations, results in a ever increasing pressure exerted on the planned termination of the term gestation in the morning hours. The obstetrician is thus in a situation in which he wants to respect the will of the mother and/or her husband on the one hand and he does not want to apply a procedure that would not be generally accepted on the other. The aim of this study is to compare the perinatal results of programmed obstetrics using the extra-amniotic PGE2 administration to a randomised group of deliveries of 1112 non-risk pregnancies.

Material and Methodology

In the period from January 1, 1992 to December 31, 1996, 1559 labours (20.3%) were induced at the 2nd Department of Gynaecology and Obstetrics in Brno. From this total, 578 elective inductions of labour were performed by extra-amniotic application of PGE2 vaginal tablets (Dinoproston 3.0 mg, Prostin vaginal tablets Upjohn). As a criterion for the elective induction of labour, a limit of 39 to 41 completed weeks of non-risk pregnancy was specified. The total number of inductions was 578 from which 241 (41.7%) were multiparas and 337 (58.2%) were primiparous women. Before the decision for the elective induction of labour, the pregnant woman had to meet the following inclusion criteria:

1. To take initiative or express her consensus with the elective induction of labour.
2. Pregnancy of 39 to 41 completed weeks.
3. Singleton pregnancy.
4. Vertex presentation.
5. No symptoms of foetal chronic or acute hypoxia.
6. Ripe cervix (Bishop score ≥ 5).
7. No negative side effects caused by the prostaglandin induction preparation in a previous labour induction (hypertonus, gastrointestinal negative side effects).
8. Non-risk pregnancy.

On the day of the elective induction of labour, the patient was admitted to the delivery ward at 6.30 a.m. After administrative reception and routine preparation for labour, the function of the foetoplacental unit was reassessed (non-stress test, amnioscopy) and the Bishop score was taken. After the separation of the inferior pole of the membranes from decidua accroding to Hamilton, either 0.5 mg (1/6 vaginal tablet) when Bishop score was ≥ 8 or 1.0 mg (1/3 vaginal tablet) (Bishop score 5 to 8) of Prostin was applied behind the internal cervical os. The patient stayed in horizontal position for app. 20 minutes and another non-stress test was carried out. If no regular contractions were established within two hours and the finding of the cervix was less than 2 cm, another identical dose of PGE2 was applied. Otherwise the amniotomy was perfomed and the labour was managed in the current way. If the finding on the cervix did not change after another two hours and no uterine contractions were established, the elective induction of labour was regarded as unsuccessful. Provided that regular contractions were established and the finding on the cervix was greater than 2 cm, the procedure was as described above. The patient was intermittently cardiotographically monitored. If the contractions were getting weaker, small doses of intravenous Oxytocin were applied by infusion. The 2nd stage labour was actively managent by means of Methylergometrin. The presence of fathers at the delivery was welcome for psychological reasons even in the case of forceps delivery. If they required it, they could even be present at the Caesarean Section.

An unsuccessful elective induction of labour was defined according to Turnbull and Anderson (1968) as follows:

1. Uterine contractions were not established after the second induction of the labour.
2. Uterine contractions were established, nevertheless, the Caesarean Section had to be carried out due to uterine hypertonia with intrauterine asphyxia that could not be managed in a conservative way or due to the fact the delivery did not progress.
3. The labour induction had to be terminated due to serious side effects.

The results of the elective inductions group were compared with a random group of 1112 non-risk pregnancy patients who delivered in the delivery ward of the 2nd Dept. of Gynaecology and Obstetrics in Brno in the period January 1, to December 31, 1996 and which met the following conditions:

1. Spontaneous onset of uterine contractions.
2. 39 to 41 weeks of pregnancy.

3. Singleton pregnancy.
4. Vertex presentation.
5. No symptoms of hypoxia.
6. Preserved amniotic sac at the first onset of contractions.
7. Non-risk pregnancy.

The patients were divided into a group of primiparous and a group of multiparous women (see table 1).

Table 1.

	Primiparous women	Multiparous women	Total
Elective induction	337 (58.2%)	241 (41.7%)	578 (100%)
Control group	569 (51.1%)	543 (48.9%)	1112 (100%)

Results

The results were statistically evaluated by student's T-test and chi^2-test.

Table 2. Results of comparison in primiparous women

Variable	Elective induction n = 337	Control n = 569	Statistical significance	
1st stage of labour	m = 337 s = 71.6	m = 315 s = 88.6	t = 5.836	($p < 0.01$)
2nd stage of labour	m = 18 s = 4.9	m = 16 s = 4.7	t = 4.016	($p < 0.01$)
3rd stage of labour	m = 9 s = 2.4	m = 8 s = 2.2	t = 0.4156	(n.s.)
Blood loss	n = 9	n = 16	u = 0	(n.s.)
Lesion	n = 36	n = 8	u = 5.111	($p < 0.01$)
Caesarean section	n = 11	n = 16	u = 0.731	(n.s.)
Forceps delivery	n = 11	n = 32	u = 0.653	(n.s.)
Revisio cavi uteri	n = 5	n = 39	u = 3.24	($p < 0.01$)
Lysis manualis	n = 3	n = 39	u = 3.863	($p < 0.01$)
Apgar less than 6	n = 11	n = 39	u = 1.262	(n.s.)

As follows from the results indicated in the charts, the first stage of labour is shorter in patients of the elective induction of labour group both in primiparous and multiparous women, while the second stage of labour is longer in patients with programmed delivery both primiparous and multiparous women. The third stage of labour is shorter in multiparous women with programmed delivery. In patients with the elective induction of labour, the rate of postpartum complications was lower in primiparous women. There were no statistically significant differences in the other variables.

Table 3. Results of comparison in multiparous women

Variable	Elective induction n = 241	Control n = 543	Statistical significance	
1st stage of labour	m = 212 s = 46.4	m = 240 s = 55.5	t = 4.689	($p < 0.01$)
2st stage of labour	m = 12 s = 4.1	m = 11 0.01	t = 2.096	($0.01 < p < 0.2$)
3rd stage of labour	m = 7 s = 2.1	m = 9 s = 2.4	t = 7.84	($p < 0.01$)
Blood loss	n = 7	n = 16	u = 0.047	
Lesion	n = 19	n = 48	u = 0.374	
Caesarean section	n = 8	n = 16	u = 0.204	
Forceps delivery	n = 4	n = 8	u = 0.316	(n.s.)
Revisio cavi uteri	n = 4	n = 40	u = 2.495	
Lysis manualis placentae	n = 3	n = 32	u = 2.684	
Apgar less than 6	n = 7	n = 16	u = 0.048	(n.s.)

Discussion

The termination of a full-term pregnancy at a time planned by the obstetrician and not by natural mechanisms of the onset of labour has been controversial since the first methods of inducing uterine contractions appeared. In the first issue of the American Journal of Obstetrics and Gynaecology in 1892, Reed presented his view that after the period in which the foetus had fully utilised the advantages of the intrauterine life, labour induction ought to be considered because of the significant risks presented by the ongoing pregnancy and he adds that the termination of pregnancy to a definite date is suitable for both the patient and the physician. Nevertheless, in the same publication protest to his proposal appeared. Holes argues that the determination of the delivery date is not quite safe, which could entail iatrogenic prematurity and the possibility of a higher rate of unnecessary Caesarean Sections. After more than a century the opinions regarding these problems remain polarised in the same way.

On one hand, the authors present better perinatal results both in the mother, the foetus and the newborn provided that the labour is induced after the foetus is mature (Betgues et al. 1989, Crump 1989, Martin et al. 1978), on the other hand the fact is emphaised that the complex mechanism of the onset of spontaneous uterine activity are not yet sufficiently known and therefore any induction of labour that is not based on a medical indication is a risky method that should not have a place in modern obstetrics (Smith et al. 1984, Tylleskar et al. 1979, Vierhout et al. 1995, Yudkin et al. 1979). If advantages of this or that attitude to delivery prevalied, such a divergence of opinions would not exist.

Publications dealing with this subject often present the views of both the advocates and the opponents of programmed obstetrics. The fact should be stressed that the programmed delivery should meet all the conditions described above, with a special regard paid to the elimination of any doubts about the maturity of the foetus. If these conditions are not met, it is not a benefit to the patient her foetus and the newborn, her family and the obstetric team, but an obstetrical

hazard. The attitude to programmed obstetrics has recently been influenced by the availability of very effective preparations inducing the uterine activity by simulating the natural processes during the onset of uterine activity. Locally applied forms of prostaglandins, especially PGE2 are involved.

The assets of programmed obstetrics are both medical and social and, last but not least, economic. In the medical sphere, prolonged pregnancy is prevented. The advantage of the planned termination of pregnancy consists in the prevention of foetus dystrophy, nevertheless, also the reduction of the incidence of postterm macroscomic foetuses contributes to the improvement of perinatal results (reduction of the Caesarean Section rate, protracted labour, shoulder dystocia and other possible traumatization of the foetus (Martin et al. 1978). When considering the termination of non-risk term pregnancy the evaluation of the fetoplacental unit function is performed, which is usually not done in pregnancies where the induction of labour is not performed. Thus the pathology can be revealed and therapeutic intervention is possible. The elective induction of labour is monitored from its very beginning and possible pathologies may be be treated without any delay. In the case of the spontaneous onset of uterine activity or after the rupture of membranes, there is medical monitoring of the pregnant woman till the moment she arrives in the delivery ward and thus no obstetric or other irregularities could be therapeutically influenced. In such cases, especially acute foetal hypoxia (prolaps of cord, its strangulation, abruptio placentae, etc.) may entail tragic consequences. The onset of the uterine activity could surprise the patient in an unsuitable place and at unsuitable time, when the transportation to hospital may not be available. It could happen that the labour takes place outside the health facility, which could result in all kinds of complications that this condition could entail both in the newborn baby and the mother. The main principle of programmed obstetrics is to induce the uterine action and to manage the labour at the optimum time and under optimum conditions, i.e. during the working hours the maximal efficiency can be expected of the departments of obstetricial and neonatal care and of other services necessary to secure adequate perinatal care (operating theatres, laboratory service, etc.). This fact is of special importance especially in small maternity hospitals with a substantial difference between the day and night service and the holiday service. Under these changed conditions, obstetrical pathology that would occur at an unsuitable moment could be difficult to solve and it would have a worse result than the same condition that would take place during the working hours.

From the point of view of the delivery ward service, the programmed delivery enables – thanks to a uniform distribution of the labours throughout the week – a rational utilisation of the personnel in the delivery room and, to a certain extentet, it prevents the alternation in the delivery room of periods activity in case "chatting and coffee breaks" and periods of frenzied activity in case of an unexpected cumulation of many deliveries at a time. It is expected that the interest in the obstetric analgesia will grow and it will be easier – even in large obstetric centers – to have an anaesthesiologist assigned for the obstetric analgesia during the working hours rather than to require of him to administer epidural analgesia at night, when he can be busy with other activities.

The possibility of choosing the alternative of programmed labour enables the patient to get rid of the tense expectancy of the onset of labour and the fear that the labour could take place at an unsuitable point of time or in an unsuitable place. Night stress during the transportation of the mother to the delivery ward, when she can be negatively affected by the problems of transport, sleepy children, her confused husband and her concern about the running of the household. A day before the date of the induction of labour, the pregnant woman can calmly prepare everything she will need in the maternity hospital, she can provide for the day care of her children and she will pass the care of the domesticities to her family or other persons. And it is also easier for the husband to ger rid of his professional duties to be present at the delivery than in the case of an unexpected onset of labour (Kato et al. 1987).

In spite of the apparently higher financial cost of the programmed deliveries due to the price of the induction preparation (especially the locally administered prostaglandins), according to the results we have obtained, the programmed delivery is cost-effective. The availability of programmed delivery helps to gain the clientele for our delivery wards, which is a significant fact in the existing economic system of our health facilities (more patients – more financial resources). In view of the fact that programmed delivery does not rank among standard interventions, the patient partially shares in covering the cost of the induction preparation. The report of Brun from 1994 moves on in the staffing of the delivery rooms covering all the groups of professionals and showing considerable economy. From the nationwide point of view, the described system is economic due to a lower rate of Caesarean Sections, reduced monitoring and hospitalisation of postdate pregnancies, etc. (Brun et al. 1994).

The results of the programmed obstetrics assessed in the literature were mostly, obtained by the use of the intravenous infusion of Oxytocin. Our protocol of induction of the uterine contractions by the extraamniotic application of PGE2 has a number of specific features. In the first place, it is the obstetric comfort of the patient, who, contrary to the immobilisation by the Oxytocin infusion, perceives the PGE2 induction as almost natural labour. The labours induced by PGE2 have their 1st stage shorter than spontaneous labours without any side effects. By applying this methods we have reached a lower incidence of Caesarean Sections, whose indications were not in any causal relation to PGE2 induction. In the induced patients, the frequency of forceps deliveries is lower as well as the incidence of revisio cavi uteri and lysis manualis placentae. Good perinatal results have been achieved, at least as evaluated by the Apgar score. We have proved that the local application of PGE2 does not affect the hemodynamics due to the persistence of ductus Botali (Matuškova et al. 1991).

The main argument of the opponents of programmed obstetrics is the possibility of the incidence of iatrogenic prematurity. It has been practically excluded by the current system of prenatal care (ultrasound biometry in the 16th week of pregnancy) and the sonographic examination prior to the elective induction of labour. Another argument is the incidence of cervicocorporal dystocia and its consequences, the pain, no labour progression, foetal hypoxia and thus an increase in the of obstetric surgery, rate expecially Caesarean Sections. These objections were not confirmed in our group.

López-Zeno proved a reduction of 26% of the incidence of Caesarean Section on a set of 351 patients with induced labour and 354 patients with spontaneous labour. It was achieved mainly by reducing the incidence of cervical dystocia (López-Zeno et al. 1992). Similar results were also obtained by Turner et al. (1988) and Frigoletto et al. (1995). We have never recommended the induction of labour to patients who made objections to the programmation of their delivery as an unnatural labour, provided that there was no medical indication for it. In view of the results obtained with the above specified protocol of the induction of the uterine activity, we are justified to state – provided that all the above-mentioned conditions are met – that the elective induction of labour is a benefit to the mother, to her family and to the staff of the delivery ward and that it does not increase the incidence of obstetric pathology that could jeopardise the perinatal results.

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